AAM 2024 ICAO'S FIRST ADVANCED AIR MOBILITY SYMPOSIUM

The UK Advanced Air Mobility Emissions Savings Opportunity

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www.eamaven.com

EA Maven

Introduction

About EA Maven

Electric Aviation Maven Ltd (EA Maven) is a management consultancy firm focusing on solving the key challenges in the area of AAM infrastructure through the provision of RAM/AAM strategy support, demand modelling, infrastructure design and due diligence services. EA Maven is a leading expert in advanced air mobility demand modelling, system planning and infrastructure design. Our clients' portfolio comprises OEMs, airports, airlines, infrastructure investors, governments and more. Our aim is to help our clients assess the potential that RAM/AAM revolution will bring to their business.

Darrell Swanson - Director / Co-Founder

- Extensive advisory experience to AAM players, supporting clients with go-to-market strategies, infrastructure planning, and regulatory challenges, AAM demand modelling, and market analysis
- Expert in the UK market as board member of British Aviation Group, a representative body for UK companies in the airport and aviation sector
- Former advisor to NASA on electric aviation infrastructure and business model and various leadership roles in aviation consultancy companies

32 years of experience

- MBA, Strategy, Finance, Entrepreneurship, Cass Business School
- MSc, Airport Planning and Management, Loughborough University

Jarek Zych - Director / Co-Founder

- Jarek specializes in demand modelling for AAM, air service development and traffic forecasting for airports, and network, fleet and schedule planning / strategy for airlines
- Significant experience in the UK, US and European markets, advising aviation clients in/out of Europe, US
- Former Sales Engineer EMEA at Cirium and Managing Consultant at Avia Solutions (GE Capital Aviation Services)

19 years of experience

- Postgraduate, Airports Financing, Warsaw School of Economics
- MSc, International Management, University of Warsaw
- BSc, Civil Engineering, Polytechnique

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Our Approach – not top-down econometric guessing

Scheduling

- **Network Scheduling** – The demand for the system of operations is then put through a scheduling tool to develop linked schedules on an OD or network basis. Outputs include but are not limited to:
  - Aircraft required, Aircraft utilisation
  - Revenue generation, Energy requirements
  - Economic impact through time savings and many others.

Demand Modelling

- **Demand Modelling** – Using a modified airline forecasting methodology we then calculate the proportion of travelling public that would switch modes given a certain density of flight operations in the system. This gives us hourly profiles for passenger demand with an understanding of mode of transport they switched from, purpose of travel and time of day.

Indexing

- **Indexing** – Identifying all possible routes between airport catchments and or cities and applying filtering to identify the routes that are potentially viable. The results are then indexed.

Data

Data, did I say data?

- Mobility data, economic, income, airline schedules, fares, travel options, socioeconomic etc, etc, etc

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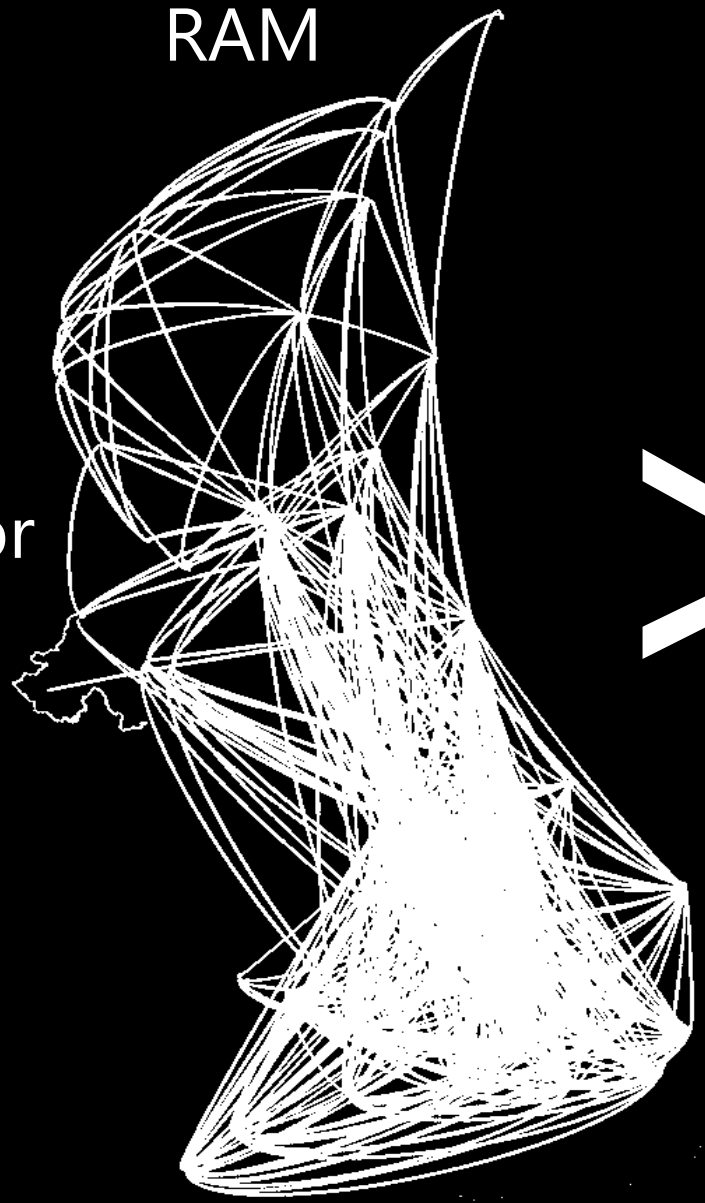
Total UK AAM Potential Summary

Routes Network

RAM

Average Sector Length 143mi



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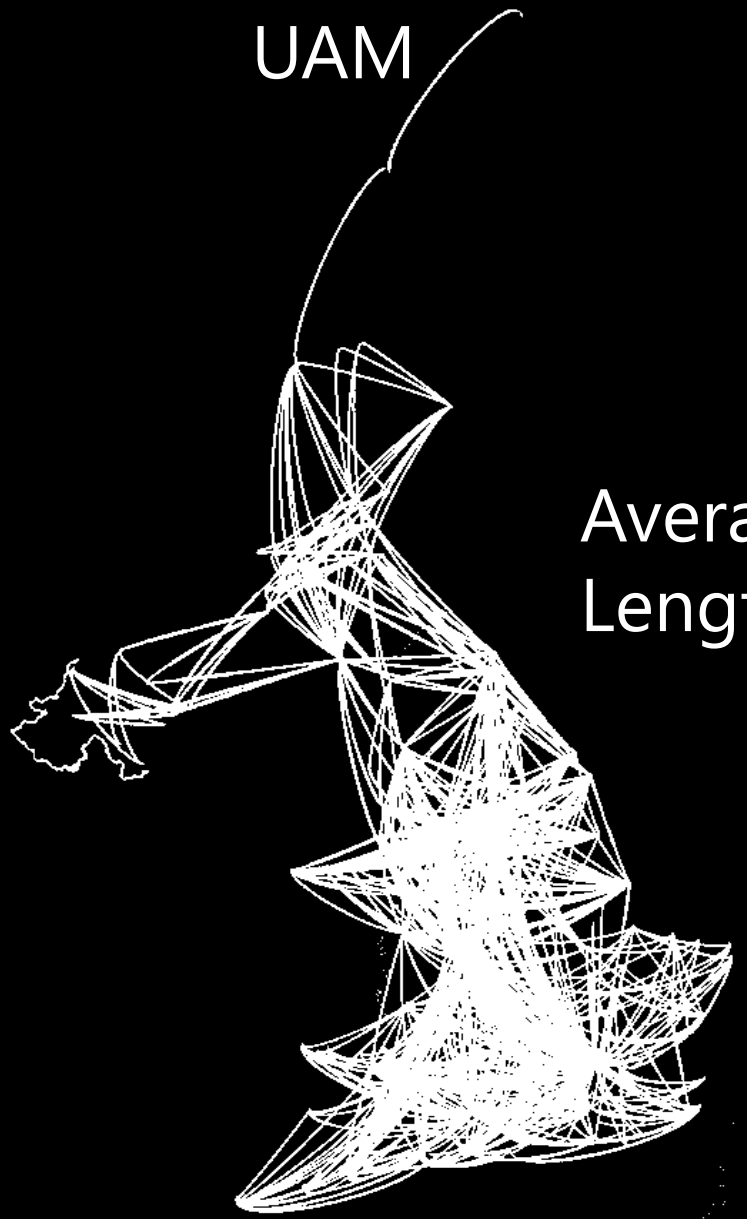
UAM

Average Sector Length 71mi



Total UK AAM Potential Summary

RAM		UAM
63/684 airports*/routes**	>	264/994 cities/routes identified with at least 96k travellers per year with 49 routes having over 1m travellers per year
TM – 430.7m travellers annually***	>	TM – 316.8m travellers annually***
82.5% of journeys by car producing significant carbon emissions	>	**75%** of journeys by car producing significant carbon emissions
21.9% business, 78.1% leisure/VFR travellers	<	33.3% business vs 66.4% leisure/VFR travellers
47.2m hours saved weekly/annually if switched to RAM**** 5.4k years annually!	>	27.8m hours saved weekly/annually if switched to UAM**** 3.2k years annually!

** Based on LAU1 UK spatial division of 400 shapes. Each airport and its respective catchment based on the shape where each airport is located plus the adjacent shapes.*
*** Total possible routings between all airports and their respective catchment areas with a minimum distance of 70 statute miles. Excluding routes touching London.*
**** Sum of all travellers on 1,706 routes analysed. Demand numbers based on airports' catchment areas.*

** Cities selected based certain sifting criteria.*
*** Total possible routings between all cities based on 3 main selection criteria: distance (50-120 statute miles), population (min 20k inhabitants per city), min travellers*
**** Sum of all travellers on 994 routes analysed. Demand scaled down based on population distribution (city-city demand adjustment).*
***** Based on mixed capture rates of top 994 routes. Time savings based on flight vs car/rail travel time ratios for biz and leisure. Economic stimulation based on the DfT WebTag data.*

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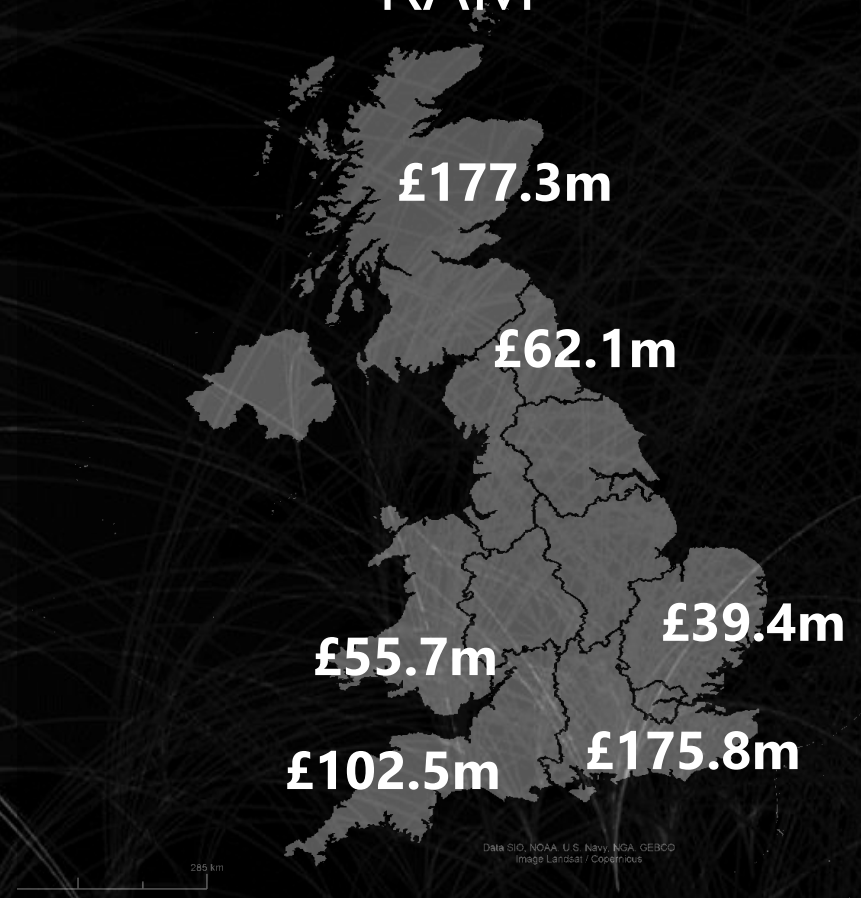
Total UK AAM Potential Summary

Economic Boost by Top Regions (annually)

RAM



£1.1bn per year****

Economic stimulation through increased productivity

>

UAM

615.9m per year****

Economic stimulation through increased productivity

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Total UK AAM Potential Summary

Aircraft, Stands, Energy, Hydrogen & Carbon Emissions

RAM

Up to 1,5k aircraft required*

448.3k/214.7k tonnes

Carbon emission savings (on people switching from cars and rail) annually assuming using 100% of SAF/JET A fuel**

120.9k tonnes – H2 Aircraft

Carbon emission savings (on people switching from cars and rail) **annual** assuming using Hydrogen (22% of blue and 78% grey hydrogen)***

2,730 GWh to create the 52m kg of hydrogen for an all-hydrogen system

* Assuming all routes are operated. Calculations based on a 9-seater aircraft; performance based on various OEMs. Annual aircraft utilisation at max 2000hrs.
** Across all routes
*** CO2 emission of 9kg per 1kg of grey hydrogen and 2kg of CO2 per 1kg of blue hydrogen.

UAM

Up to 2.2k aircraft required*

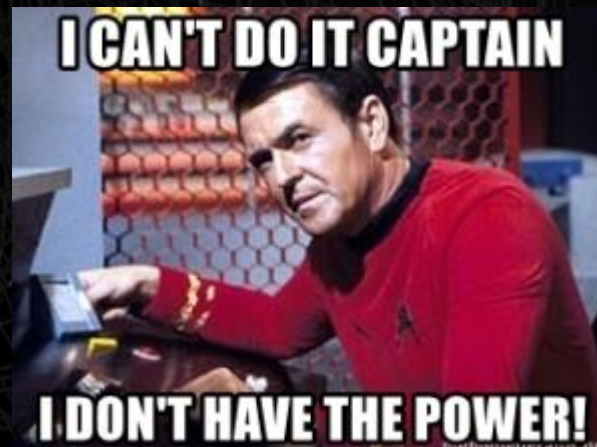
905/314 stands/vertiports required**

178k tonnes

Carbon emission savings annually**

849.1 GWh

cumulative energy required annually**



* Assuming all routes are operated. Calculations based on a 4-seater aircraft; performance based on various OEMs. Annual aircraft utilisation at max 2800hrs
** Across all routes

Total UK AAM Potential Summary

Airline/Operator Revenues

RAM

£2.8bn Annual operator ticket revenue

£621m
Annual airport operator revenue from landing and ground handling charges

£203m
Annual airport operator revenue from passenger charges

>

UAM

£2.27bn Annual operator ticket revenue

£495.3m
Annual vertiport operator revenues from landing and ground handling charges

£100.9m
Annual revenues for vertiport operators from energy

£953m
Capital cost of infrastructure excluding planning application and design costs

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UAM or RAM

Which is potentially more economically significant?

Measure	RAM	< >	UAM	Total/Note
Cities/Airports	63	<	264	327
Average Sector Length (mi)	143	>	76	
Potential Routes	684	<	994	1,678
Target market	430	>	316	
Hours Saved (m hours)	47.2	>	27	74.2
Economic Impact (£bn) increased productivity	1.1	>	0.61	£1.71bn
Operator revenues (£bn) tickets sales	2.8	>	2.27	£5.07bn
Routes/City or Airport	10.9	>	3.8	RAM is **3**x bigger than UAM
Economic Impact/City or Airport £m	15.9	>	3.8	RAM is **8**x bigger than UAM

- In terms of potential economic impact, RAM is 8.16x bigger than UAM
- This is because RAM offers more utility to travellers in terms of potential time savings and hence the ability for them to be more economically productive.
- An additional contributory factor is that the catchment area for airports in this study are larger than cities given the longer range of fixed wing aircraft attributing to increased utility of RAM flights. This approach is consistent with airport catchment area analysis.

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THANK YOU!

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Thank You!

ICAO